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Vacuolar H(+)-pyrophosphatase.

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The H(+)-translocating inorganic pyrophosphatase (H(+)-PPase) is a unique, electrogenic proton pump distributed among most land plants, but only some alga, protozoa, bacteria, and archaeobacteria. This enzyme is a fine model for research on the coupling mechanism between the pyrophosphate hydrolysis and the active proton transport, since the enzyme consists of a single polypeptide with a calculated molecular mass of 71-80 kDa and its substrate is also simple. Cloning of the H(+)-PPase genes from several organisms has revealed the conserved regions that may be the catalytic site and/or participate in the enzymatic function. The primary sequences are reviewed with reference to biochemical properties of the enzyme, such as the requirement of Mg(2)(+) and K(+). In plant cells, H(+)-PPase coexists with H(+)-ATPase in a single vacuolar membrane. The physiological significance and the regulation of the gene expression of H(+)-PPase are also reviewed.

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